Surveillance of U.S. *Salmonella* Enteritidis Outbreaks in 2001 Using Phage Typing

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Background: Phage typing is a subtyping method used to monitor trends within a given serotype of *Salmonella*. The CDC is the U.S. reference center for phage typing of human isolates of *Salmonella* serotypes Enteritidis and Typhimurium. Historically, *Salmonella* Enteritidis (SE) has been the second most common serotype reported to the CDC through the Public Health Laboratory Information System (PHLIS). SE outbreak causes in 2000 included common phage types 8 (31% of outbreaks), 13a (21%), 4 (16%), 13 (9%) and 2 (3%). The results of phage typing analysis of 2001 outbreak isolates are presented here.

Methods: State and local health departments sent human, and in some instances, associated environmental outbreak isolates to the CDC for phage typing. Phage typing was performed using the scheme developed by the Public Health Laboratory Service in Colindale, England.

Results: Isolates from 24 (52%) of 46 SE outbreaks reported in 2001 were available for phage typing. The number of isolates sent to the CDC for each outbreak ranged from 1 to 50, with a median of 5. Nine (38%) of 24 outbreaks were caused by phage type 8, 5 (21%) by phage type 13a, 3 (13%) by RDNC (Reacts but Does Not Conform) strains, 2 (8%) by phage type 13, 2 (8%) by phage type 2, and one (4%) by phage type 1. Two outbreaks involved novel SE strains never detected before in human outbreaks in the U.S.; one caused by phage type 30 (4%) and another by provisional phage type 913 (4%).

Conclusion: SE phage type 8 outbreaks increased slightly from 31% in 2000 to 38% in 2001. The percentage of phage types 13a and 13 outbreaks essentially stayed the same. Phage type 4, which accounted for 16% of the outbreaks in 2000, was not identified in any of the 24 available outbreak isolates in 2001. However, two new phage types, 30 and provisional 913, caused outbreaks in 2001. Raw almonds are a possible vehicle of infection for the phage type 30 outbreak; mung bean sprout consumption may have played a role in phage type 913 infections. Phage typing is a valuable method for monitoring SE trends and detecting new emerging strains such as 30 and 913. The method facilitates trend analysis on the national level and comparison with international trends.